

NSF 00-78

# **INTEGRATIVE GRADUATE EDUCATION AND RESEARCH TRAINEESHIP (IGERT) PROGRAM**

## **PROGRAM SOLICITATION**

### **DEADLINE DATES:**

#### **2000 Competition**

**Preproposal: July 19, 2000**

**Full Proposal: January 26, 2001**

#### **2001 Competition**

**Preproposal: June 28, 2001**

**Full Proposal: January 18, 2002**

### **DIRECTORATES FOR:**

**BIOLOGICAL SCIENCES**

**COMPUTER AND INFORMATION SCIENCE AND ENGINEERING**

**EDUCATION AND HUMAN RESOURCES**

**ENGINEERING**

**GEOSCIENCES**

**MATHEMATICAL AND PHYSICAL SCIENCES**

**SOCIAL, BEHAVIORAL, AND ECONOMIC SCIENCES**

**OFFICE OF POLAR PROGRAMS**



**NATIONAL SCIENCE FOUNDATION**

NSF 00-78

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## **SUMMARY OF PROGRAM REQUIREMENTS**

### **GENERAL INFORMATION**

#### **Program Title:**

Integrative Graduate Education and Research Traineeship (IGERT) Program

#### **Synopsis of Program:**

Initiated in 1997, the IGERT program was developed to meet the challenges of educating Ph.D. scientists and engineers with the multidisciplinary backgrounds and the technical, professional, and personal skills needed for the career demands of the future. The program is intended to catalyze a cultural change in graduate education, for students, faculty, and universities, by establishing new, innovative models for graduate education and training in a fertile environment for collaborative research that transcends traditional disciplinary boundaries. It is also intended to facilitate greater diversity in student participation and preparation and to contribute to the development of a diverse, globally-aware, science and engineering workforce.

#### **Cognizant Program Officers:**

IGERT Coordinating Committee, listed in the program solicitation.

#### **Applicable Catalog of Federal Domestic Assistance (CFDA) Number:**

47.074 (BIO); 47.070 (CISE); 47.076 (EHR); 47.041 (ENG); 47.050 (GEO); 47.049 (MPS);  
47.075 (SBE); 47.078 (OPP)

## **ELIGIBILITY INFORMATION**

Organization Limit: Academic institutions in the United States and its territories that grant the Ph.D. degree and have research and education programs in the sciences and engineering may submit. Non-Ph.D. granting, nonacademic, and international institutions may serve as collaborating institutions.

PI Eligibility Limit: None

Limit on # of Preproposals: None

Limit on # of Full Proposals: Invitation to submit a full proposal is based on merit review of the preproposal. An institution may submit no more than two single-institution full proposals and, as lead institution, one multi-institution full proposal.

## **AWARD INFORMATION**

Type of Award: Continuing Grant

Estimated Number of Awards: 20

Anticipated Funding Amount: Up to \$2.7 million per award over 5 years, depending upon the availability of funds.

## **PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS**

### **A. Proposal Preparation Guidelines**

Proposal Preparation Instructions: The program contains deviations from the standard *Grant Proposal Guide* (GPG) proposal preparation guidelines. Please see the program solicitation for further information.

### **B. Budgetary Information**

Cost Sharing Requirements: None

Indirect (F&A) Limitations: 8% of total direct cost, excluding equipment and cost-of-education allowances.

Other Budgetary Limitations: Awards up to \$500,000 per year for five years. Up to an additional \$200,000 in the first year for research equipment, software, and special purpose materials. Graduate student stipend allowance is \$18,000 per year. All graduate and other stipend recipients must be citizens or permanent residents of the U.S.

### **C. Deadline Dates**

Letter of Intent: Not Required

#### 2000 Competition

Preproposal: July 19, 2000

Full Proposal: January 26, 2001

#### 2001 Competition

Preproposal: June 28, 2001

Full Proposal: January 18, 2002

### **D. FastLane Requirements**

FastLane Submission: Use of FastLane required for Preproposals and Full Proposals

FastLane Contact: FastLane User Support, at 703-306-1142, or [fastlane@nsf.gov](mailto:fastlane@nsf.gov)

## **PROPOSAL REVIEW INFORMATION**

Merit Review Criteria: Standard National Science Board approved criteria, supplemented by program-specific criteria described in this program solicitation.

## **AWARD ADMINISTRATION INFORMATION**

Grant Award Conditions: GC-1 or FDP-III

Reporting Requirements: Additional reporting requirements apply. Please see the program solicitation for further information.

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## **I. INTRODUCTION**

The National Science Foundation announces continuation of the Integrative Graduate Education and Research Traineeship (IGERT) program. Initiated in 1997, the IGERT program was developed to meet the challenges of educating Ph.D. scientists and engineers with the multidisciplinary backgrounds and the technical, professional, and personal skills needed for the career demands of the future. The program is intended to catalyze a cultural change in graduate education, for students, faculty, and universities, by establishing new, innovative models for graduate education and training in a fertile environment for collaborative research that transcends traditional disciplinary boundaries. It is also intended to facilitate greater diversity in student participation and preparation and to contribute to the development of a diverse, globally-aware, science and engineering workforce.

IGERT is an NSF-wide endeavor involving the Directorates for Biological Sciences (BIO), Computer and Information Science and Engineering (CISE), Education and Human Resources (EHR), Engineering (ENG), Geosciences (GEO), Mathematical and Physical Sciences (MPS), Social, Behavioral, and Economic Sciences (SBE), and the Office of Polar Programs (OPP).

## **II. PROGRAM DESCRIPTION**

Proposals submitted to the IGERT program must be innovative, research-based, graduate education and training activities in critical, emerging areas of science and engineering. They must be organized upon a multidisciplinary research theme and involve a diverse group of faculty members and other investigators with appropriate expertise in research and teaching. The multidisciplinary research theme provides a framework for integrating research and education and for promoting collaborative efforts across departments and institutions. Students should gain various strengths while maintaining competence in a major field by focusing on problem-oriented rather than discipline-oriented research. The IGERT project should offer experience relevant to both academic and nonacademic careers by linking graduate research, through internships and mentoring, with research in industrial, national laboratory, or other settings. The globalization of research and career opportunities places importance on an international perspective in graduate education, such as through internships abroad or other experiences appropriate to the research area. The graduate experience should also equip students to understand and integrate scientific, technical, business, social, and ethical issues to confront the challenging problems of the future.

The multidisciplinary research theme may draw upon investigators from one or more academic departments within a single institution or from more than one institution. This represents a change from

previous IGERT competitions in the recognition that under some circumstances a multidisciplinary research theme can come from a single academic department. Because the primary emphasis of the IGERT program is on innovative approaches to education and training of doctoral students, proposals must make clear what is different from existing programs at the institution. Participation of individuals at the undergraduate, masters and postdoctoral levels may be included if such participation clearly strengthens the doctoral program. Please bear in mind that all stipend recipients must be citizens or permanent residents of the U.S.

### **Features of IGERT Projects**

IGERT projects are expected to incorporate the following features:

- A comprehensive multidisciplinary research theme, appropriate for doctoral-level research, to serve as the foundation for traineeship activities;
- Integration of the multidisciplinary research theme with innovative graduate education and training mechanisms, curriculum, and other educational opportunities that foster strong interactions among participating students and faculty;
- An environment that exposes students to a broad base of state-of-the-art research tools and methodologies;
- Provision for developing professional and personal elements such as communication, teamwork, and leadership;
- Integrated instruction in ethics and the responsible conduct of research;
- Opportunities for career development, such as may be provided by internships in international, industrial, national laboratory, or other settings;
- Fostering of a global perspective for students;
- Formal administrative plan and organizational structure that ensures effective management of the requested resources to achieve the goals of the IGERT project;
- Institutional strategy and operational plan for student recruitment, mentoring, and retention efforts aimed at members of groups underrepresented in science and engineering (i.e., women, racial and ethnic minorities, and persons with disabilities) to ensure preparation of a diverse science and engineering workforce; and
- Well-defined strategy and methodology for external, independent assessment of project performance.

### **Principal Investigator**

The Principal Investigator (PI) shall be the director of the IGERT project, and is expected to be an essential participant in its education and research activities. The PI will have overall responsibility for

administration of the award, management of the project, and for interactions with the NSF. The PI and the home institution are expected to develop an administrative structure for the IGERT project that enables faculty members, students, and others involved to interact effectively in furthering the project's goals.

## **Two-Stage IGERT Competition**

Applicants compete for support from the IGERT program in a two-stage process. In the first stage, applicants submit a preliminary proposal (preproposal) that outlines the planned IGERT project. In the second stage, based on merit review of the preproposals, approximately 60-70 applicants will be invited to submit full proposals. Only those applicants invited to submit full proposals may do so, consistent with the institutional limitations discussed in Eligibility, Section III, below.

## **III. ELIGIBILITY**

Academic institutions in the United States and its territories that grant the Ph.D. degree and have research and education programs in the sciences and engineering are invited to apply. Projects may involve more than one institution, but a single institution must accept overall management responsibility. Non-Ph.D. granting, nonacademic, and international institutions may serve as collaborating institutions. To encourage the development of innovative projects, there is no limit to the number of preproposals that may be submitted by an institution in response to this solicitation. However, NSF does not anticipate making more than one IGERT award to a given institution as a result of any single competition. Accordingly, an institution may submit no more than two single-institution full proposals and, as lead institution, one multi-institution full proposal per round of competition. Projects involving research in any of the areas appropriate for funding by NSF are eligible.

## **IV. AWARD INFORMATION**

Awards will be made in amounts up to \$500,000 per year for a duration not to exceed five years. Up to an additional \$200,000 may be provided during the first year of the award for appropriate research equipment and special purpose research materials. NSF anticipates that approximately 20 awards will be made as a result of each annual competition, depending on the quality of the proposals and the availability of funds.

## **V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS**

### **A. Preproposal and Full Proposal Preparation Instructions**

Preproposals and full proposals must be prepared and submitted through the FastLane system (see Section F, below). They should be prepared in accordance with the general guidelines contained in the *Grant Proposal Guide* (GPG) (NSF 00-2). The complete text of the GPG (including electronic forms) is available electronically on the NSF Web Site at:

<http://www.nsf.gov/pubs/2000/nsf002/start.htm>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from [pubs@nsf.gov](mailto:pubs@nsf.gov).

Applicants are reminded to identify the program solicitation number NSF 00-78 in the *Program Announcement/Solicitation* block on the NSF Form 1207, *Cover Sheet for Proposal to the National Science Foundation*. They must also specify IGERT Preproposal or IGERT Full Proposal in the block *For Consideration by NSF Organization Unit*. Compliance with these requirements is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

## **B. Preproposal Content**

The preproposal must contain only the items listed below in the order shown. No appendices or letters of endorsement are permitted. Preproposals containing appendices or such letters, or that exceed the page limits indicated below, will be returned without review.

**Cover Sheet** (NSF Form 1207): An informative title for the proposed IGERT project must be provided on the appropriate line. Check the box for preproposal.

**Information about Principal Investigators** (NSF Form 1225) is automatically generated by FastLane. Note that NSF limits the number of Principal Investigators and co-Principal Investigators to one PI and four co-PIs. Additional lead personnel can be designated in the List of Participants of the Project Description, Section (C) a, below.

**(A) Project Summary** (1-page limit): Provide a brief (300 words or less) description of the traineeship program, including the research theme, education features and objectives. At the top of this page include the title of the IGERT project, the name of the director, and the lead institution. Also list any other participating institutions.

**(B) Table of Contents** (NSF Form 1359): The Table of Contents is generated by FastLane and cannot be edited.

**(C) Project Description:** The project description contains the following items a through f. Items a and f are each limited to a length of one page. Items b, c, d, and e, are limited to a combined total length of five pages, inclusive of tables, figures, or other graphical data.

**a. List of Participants** (1-page limit): Include departmental and institutional affiliation of all faculty members and other senior level personnel expected to mentor students or otherwise play an important role in the project.

**b. Vision, Goals, and Thematic Basis:** Discuss the vision, goals, and anticipated impact of the proposed IGERT project. Describe the thematic basis and unifying aspects of the multidisciplinary research and education activities to be offered. Include a discussion of what is currently missing from graduate education and training or what could be done more effectively, and how the proposed project will address these issues. Be specific about what is new and innovative.

**c. Major Research Efforts:** Describe the multidisciplinary research theme and the major research efforts that are intended to serve as the foundation of the IGERT project. The research areas should be described in sufficient detail for reviewers to assess their scientific merit and relevance to the multidisciplinary theme. Be clear about what is different from existing interdisciplinary programs at the institution.

**d. Education and Training:** Discuss the graduate education and training activities that are central to the proposed IGERT project. Indicate how these activities promote diversity as an integral component. Discuss career development opportunities for students and activities to develop desired professional and personal elements, including instruction in ethics and the responsible conduct of research. Novel aspects of the program should be emphasized to help reviewers judge the potential impact of the proposed activities.

**e. Management and Evaluation:** Briefly describe the strategies for award management and for evaluation of the project.

**f. Expected Resource Commitments** (1-page limit): Briefly describe anticipated resource commitments to the IGERT project by participating institutions and other sources. Any such commitments need not be firmly established at the time of preproposal submission; therefore, no letters of commitment or endorsement from the submitting institution or other entities are allowed.

**(D) References Cited** (1-page limit)

**(E) Biographical Sketches** (1-page limit per participant): For all participants listed in Section (C) a, above, provide a biographical sketch that includes a brief description of current research support. The sketch should include the individual's academic and professional history, and may include a list of the five most significant publications. Other activities or accomplishments may be listed. In choosing what to include, emphasize information that will be helpful in understanding the strengths, qualifications, and impact the individual will bring to the proposed IGERT project.

**(F) Estimated Five-Year Budget Summary** (NSF Form 1030): Prepare a one page, five-year summary of total estimated expenses. Budgets should emphasize graduate student support. Within FastLane, enter your five-year summary budget as Year 1, and FastLane will create the cumulative budget automatically.

**C. Full Proposal Content**

Only those applicants invited to submit full proposals may do so. The full proposal must contain the following items in the order indicated. Proposals that do not adhere to the specified page limitations and that contain items other than those required will be ineligible for consideration and will be returned without review.

**Cover Sheet** (NSF Form 1207): An informative title for the proposed IGERT project must be provided on the appropriate line. Enter the related preproposal number. You may list a starting date of July 1 in the calendar year for the submission deadline of full proposals.

**Information about Principal Investigators** (NSF Form 1225) is automatically generated by FastLane. Note that NSF limits the number of Principal Investigators and co-Principal Investigators to one PI and four co-PIs. Additional lead personnel can be designated in the List of Participants of the Project Description, Section (C) a, below.

**(A) Project Summary** (1-page limit): Provide a brief (300 words or less) description of the traineeship program, including the research theme, education features and objectives. At the top of this



page include the title of the IGERT project, the name of the director, and the lead institution. Also list any other proposed participating institutions, national or international.

**(B) Table of Contents** (NSF Form 1359): The Table of Contents is generated by FastLane and cannot be edited.

**(C) Project Description:** The project description section contains the following items a through k. Page limitations specified for each item are inclusive of tables, figures, or other graphical data, and must be adhered to.

**a. List of Participants** (1-page limit): Include departmental and institutional affiliation of all faculty members and senior level personnel expected to mentor students or otherwise play an important role in the project.

**b. Vision, Goals, and Thematic Basis** (1-page limit): Discuss the vision, goals, and anticipated impact of the proposed IGERT project. Describe the thematic basis and unifying aspects of the multidisciplinary research and education activities to be offered. Include a discussion of what is currently missing from graduate education and training or what could be done more effectively, and how the proposed project will address these issues. Benefits to be realized from opportunities for cross-disciplinary cooperation in education and research should be emphasized. Be specific about what is new and innovative.

**c. Major Research Efforts** (15-page limit): Describe the major research efforts that are intended to serve as the foundation of the IGERT project. At most, five research areas may be described. This restriction is intended to limit the size of the proposal, not the number of participating faculty members or the scope of the project. In describing the individual research areas, emphasize both the cutting-edge aspects as well as how the various research areas integrate to form the thematic basis for the overall multidisciplinary project. Each research area must specify the faculty members and other principal participants and be written in sufficient detail to enable assessment of the scientific merit and impact. Be clear about what is different from existing interdisciplinary programs at the institution. Needs for special materials, shared instruments, travel to research sites, or interdisciplinary courses must be justified in the context of the research areas for which they are required.

**d. Education and Training** (10-page limit): Describe the education and training activities that are central to the proposed IGERT project. Novel aspects of the program should be emphasized to help reviewers judge the potential impact of the proposed activities. Indicate how the various proposed research and educational experiences will be integrated into an effective graduate traineeship program. Identify faculty members or others with primary responsibility for these integrative efforts. If planned student training includes international, industrial or other internships, the potential mentors should be identified. Describe provisions for developing professional and personal elements such as communication, teamwork, leadership, an international perspective, and instruction in ethics and the responsible conduct of research. The proposal should elaborate on the role of diversity as an integral part of the program, and on the expected time for completing the degree. The role of undergraduate, masters, and postdoctoral components, if proposed, must also be described with sufficient detail to clarify the benefit to the graduate traineeship program and to justify support through this type of award.

**e. Recruitment and Retention** (2-page limit): Describe plans for recruitment, mentoring, and retention of trainees, including specific provisions for members of groups underrepresented in science and engineering. Identify the Ph.D. program(s) in which the IGERT graduate students may enroll. Discuss the phasing of new students into the IGERT program.

**f. Organization and Management** (2-page limit): Describe plans and procedures for the organization and management of the proposed activity. The plan should be specific and clear, and include use of a formal mechanism that assures the fair and effective allocation of group resources. Procedures for selecting students and others who will receive stipends or otherwise share in group funds must be described, as should methods for allocating use of shared equipment to be acquired with IGERT funds. Relationships to other faculty and equipment at the institution, and elsewhere if relevant, should be described as should the relationship to any existing grants that provide funds for related training and educational activities.

**g. Performance Assessment** (1-page limit): Describe a performance plan and methodology that relates the goals of your IGERT project to indicators and specific measurements for assessing progress toward goal achievement. This assessment should involve evaluators who are external to the project, who can render an objective evaluation and whose expertise spans the education and research objectives of the IGERT project. NSF will evaluate awarded IGERT projects, on an annual basis, through a Web-based questionnaire that standardizes the evaluation across all sites (see Section VII C).

**h. Recruitment and Retention History** (1 page per participating department/program): Explain your capacity to host an IGERT site, and your past performance and ability to attract well-qualified students in science and engineering, including those from underrepresented groups. Provide the following information regarding recruitment and retention of students in the participating departments/programs: (1) total number of applicants, (2) total number of applicants accepted, (3) total number of applicants who enrolled, (4) total number of students currently enrolled in the program indicating part-time and full-time status, (5) total number of Ph.D.s awarded, (6) average time to degree, and (7) other relevant measures of student success. Additionally, provide separate data for women, underrepresented minorities, and persons with disabilities for each of the above categories. A tabular format should be used with separate tables for each participating department/program.

**i. Recent Training Experience** (1-page limit): Provide information about any recent experience with other traineeship programs, including a discussion of outcomes. If the IGERT program builds on a recent traineeship experience, discuss what would be the new value-added aspects of the IGERT project.

**j. Collaborators** (2-page limit): In order to identify potential conflicts of interest in the review process, provide a consolidated alphabetical list of current and past collaborators during the last four years, and their current institutional affiliation, for all participants listed in Section (C) a, above. This list must also include former graduate students and postdoctoral fellows who have been associated with the faculty participants over the last five years.

**k. Existing Facilities and Equipment** (1-page limit): Include a brief description of available facilities, including major instruments required for the research. If requested equipment or materials duplicate existing items, explain the need for the additional equipment.

**(D) References Cited** (3-page limit)

**(E) Biographical Sketches and Current Support** (2-page limit each for PI and co-PIs; 1-page limit each for other participants): For all participants listed in Section (C) a, above, provide a biographical sketch that includes a brief description of current research support. The sketch should include the individual's academic and professional history, and may include a list of the five most significant publications. Other activities or accomplishments may be listed. In choosing what to include, emphasize information that will be helpful for understanding the strengths, qualifications, and impact the individual will bring to the proposed IGERT project.

**(F) Budget and Allowable Costs** (NSF Form 1030): Provide a budget for each year of support requested, not to exceed \$500,000 each year for up to 5 years, exclusive of first-year equipment funds discussed below. The FastLane system will automatically fill out the cumulative 5-year budget for the proposal. The major portion of awarded funds must be used for doctoral student stipends, training and educational activities, and for related expenditures, such as student travel, publication costs, and recruitment. Travel funds should be budgeted in each year for the Principal Investigator and for an additional person to attend annual meetings at the NSF. No funds for faculty research or faculty salaries may be requested, with the exception that up to one month per year of salary support for the Principal Investigator for management purposes may be requested. Support for short-term visitors and funding of a limited amount of administrative support may be requested. The NSF contribution to the graduate stipend is \$18,000 per year per student, with a cost-of-education allowance (tuition and normal fees) of \$10,500 per year per student. List funds requested for graduate students in Participant Support Costs: stipends in F.1, cost-of-education allowances in F.3, and travel in F. 2. Undergraduate stipends should be consistent with those of NSF's Research Experiences for Undergraduates (REU) program (<http://www.nsf.gov/cgi-bin/getpub?nsf96102>), and postdoctoral stipends may be determined by the institution. Both should be listed in B.4. All stipend recipients must be citizens or permanent residents of the U.S.

Funds for the purchase of shared, special-purpose research equipment may be requested. Personnel and shop costs may be requested for developing and constructing special instruments, and for purchasing computer software or other special purpose materials. The total funds requested for research equipment, software, and special purpose materials may not exceed \$200,000; if awarded, these funds will be provided in the first year of the grant. Limited funds intended to partially defray the costs of research by students may also be requested. Funds for facility renovation or for equipment installation or maintenance are not allowed. Each award will carry an 8% overhead allowance based on the total direct cost, excluding equipment and cost-of-education allowances.

For multi-institution projects, the lead institution shall submit the proposal, with other participating institutions included under subcontracts. Budgets shall be provided for the overall project as well as individually for the lead institution and for each participating institution that receives a subcontract.

**Budget Justification** (3-page limit): A brief justification for funds in each budget category should be provided with Section (F), above. Indicate the number of graduate students to be supported and the duration of their support on IGERT funds. For shared equipment and special materials, specify the model, source, and current or expected cost whenever possible, with a brief explanation of the need for each requested item and a description of provisions for maintenance and operating expenses. Provide details of institutional cost sharing, if any, and of other sources of support for the IGERT project, such as government, industry, or private foundations. Provide a listing of all relevant

documentation, including that for institutional commitments, commitments by any other sources of funding, and commitments by any organizations expected to participate. If internships are planned, the willingness of the host organization, including foreign institutions, and of the individual mentors to participate should be included in the documentation. Do not list or include letters whose sole purpose is to endorse the project.

**(I) Supplementary Documentation:** Up to six letters of commitment may be provided as part of the proposal. They should be scanned and placed in this Section.

#### **D. Cost Sharing Requirements**

Cost sharing is not required by the IGERT program.

#### **E. Deadline Dates**

Preproposals and full proposals must be submitted via FastLane by 5:00 PM (local time) on the appropriate deadline dates listed at the beginning of this solicitation. Applicants are urged to submit well in advance of the stated deadlines to avoid any possible delays in use of the FastLane system. The Principal Investigator is responsible for the completeness and accuracy of the proposal as submitted. Unless requested by the NSF, additional information may not be sent following proposal submission.

#### **F. FastLane Requirements**

Proposers are required to prepare and submit preproposals and full proposals for this solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at <https://www.fastlane.nsf.gov/a1/newstan.htm>.

Only full proposals require submission of the signed paper copy of the proposal Cover Sheet (NSF Form 1207). A signed Cover Sheet is not required for preproposals. The signed Cover Sheet for full proposals should be forwarded to NSF at the address below within five working days following full proposal submission:

NSF 00-78 – IGERT Program  
National Science Foundation  
DIS – FastLane Cover Sheet  
4201 Wilson Blvd.  
Arlington, VA 22230

Full proposals that have EPSCoR certification must include the signed certification form (NSF Form 1404) with the signed Cover Sheet. (For more information on EPSCoR certification and co-funding eligibility, see: <http://www.ehr.nsf.gov/ehr/epscor/report/cofund.htm>.)

## **VI. PROPOSAL REVIEW INFORMATION**

### **A. Preproposal and Full Proposal Review Process**

Preproposals and full proposals submitted in response to this solicitation will be evaluated by multidisciplinary panels of experts. Panel reviewers will be selected for their relevant cross-disciplinary expertise in substantive areas of the proposed research and education projects by Program Officers on the IGERT Coordinating Committee charged with oversight of the review process. NSF invites proposers to suggest at the time of submission the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts of interest with the proposer. Efforts are made to secure diversity among reviewers and to recruit reviewers from nonacademic organizations and minority-serving institutions.

Preproposals and full proposals will be reviewed using the following two general review criteria established by the National Science Board. Following each criterion are potential considerations that reviewers may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Reviewers will be asked to address only those that are relevant to the proposal and for which they are qualified to make judgements.

- **What is the intellectual merit of the proposed activity?**

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

- **What are the broader impacts of the proposed activity?**

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Principal Investigators should address the following elements in their proposal to provide reviewers with the information necessary to respond fully to both of the above-described NSF merit review criteria. NSF staff will give these elements careful consideration in making funding decisions.

### ***Integration of Research and Education***

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

### ***Integrating Diversity into NSF Programs, Projects, and Activities***

Broadening opportunities and enabling the participation of all citizens – women and men, underrepresented minorities, and persons with disabilities – is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

### **Additional IGERT Considerations**

In furthering the IGERT program's objectives, reviewers will be asked to place emphasis on the following considerations in their merit review evaluations:

- Importance and coherence of the multidisciplinary research theme, including its effectiveness as an intellectual focus for all participating scientists and engineers;
- Quality of the proposed major research efforts and their appropriateness to the multidisciplinary research theme;
- Quality and innovation in the planned graduate education and training activities, including provisions for developing professional and personal elements such as communication, teamwork, leadership, and instruction in ethics and the responsible conduct of research;
- Effectiveness of career development opportunities, such as may be provided by internships in international, industrial, or other settings;
- Appropriateness of the formal administrative plan and organizational structure in assuring fair and effective allocation of group resources, including institutional commitment to the project;
- Effectiveness of the strategy for preparing a diverse, globally-aware, science and engineering workforce, including operational plans for student recruitment, mentoring, and retention;
- Appropriateness of the plans for assessment of project performance; and
- Appropriateness of the budget.

### **B. Review Protocol and Associated Customer Service Standard**

All preproposals and full proposals will be carefully reviewed by multidisciplinary panels of experts. The intent of the preproposal review is to identify applicants most likely to submit competitive full proposals. Review panels will be asked to formulate a recommendation to either support or decline each proposal. The Program Officers on the IGERT Coordinating Committee assigned to manage the review process will consider the advice of the review panels in making their recommendations.

For each proposal, a summary rating and accompanying narrative of the panel deliberations (panel summary) will be completed and signed by the panel. An individual rating and accompanying narrative will also be completed and signed by at least three reviewers on the panel assigned to provide a written review of the proposal. In all cases, reviews are treated as confidential documents. Verbatim copies of the individual reviews and panel summary, excluding the names of the reviewers, are mailed to the applicant. In addition, the applicant will receive an explanation of the decision to award or decline funding.

NSF will inform preproposal applicants within four months after the submission deadline whether they are being declined or are being invited to submit to the full proposal competition. This notification will allow invited applicants approximately three months time to prepare full proposals. Applicants submitting full proposals will receive notice of the outcome of the competition within four months following the full proposal submission deadline.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Applicants are cautioned that only a Grants Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants Officer does so at its own risk.

## **VII. AWARD ADMINISTRATION INFORMATION**

### **A. Notification of the Award**

Notification of the award is made to the submitting organization by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI. A, for additional information on the review process).

### **B. Grant Award Conditions**

An NSF grant consists of: (1) the award letter, which includes any special provisions applicable to the grant and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable grant conditions, such as Grant General Conditions (GC-1)\* or Federal Demonstration Partnership (FDP-III) Terms and Conditions;\* and (5) any NSF brochure, program guide, announcement or other NSF issuance that may be incorporated by reference in the award letter. Electronic mail notification is the preferred way to transmit NSF grants to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements. (\*These documents may be accessed electronically on NSF's web site at [http://www.nsf.gov/home/grants/grants\\_gac.htm](http://www.nsf.gov/home/grants/grants_gac.htm). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone 301.947.2722 or by e-mail from [pubs@nsf.gov](mailto:pubs@nsf.gov).)

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) (NSF 99-4), Chapter II, available electronically on the NSF web site at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is 202.512.1800. The GPM may be ordered through the GPO web site at <http://www.gpo.gov>.

## C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant program officer at least 90 days before the end of the current budget period. Any proposed carrying forward of funds should be justified.

NSF will evaluate awarded IGERT projects, on an annual basis, through a Web-based questionnaire that standardizes the evaluation across all sites (see the IGERT Web page for guidelines, at <http://www.nsf.gov/igert>).

Within 90 days after the expiration of a grant, the PI is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented an electronic project reporting system, available through FastLane. This system permits electronic submission and updating of project reports, including information on: project participants (individual and organizational); activities and findings; publications; and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

## VIII. CONTACTS FOR ADDITIONAL INFORMATION

General information regarding the IGERT program can be obtained from the NSF Web site at <http://www.nsf.gov/igert>. Specific inquiries should be directed to one of the following members of the IGERT Coordinating Committee:

BIO:	Gregory K. Farber-DBI	<a href="mailto:gfarber@nsf.gov">gfarber@nsf.gov</a>
	Hector E. Flores-MCB	<a href="mailto:heflores@nsf.gov">heflores@nsf.gov</a>
CISE:	W. Richards Adrion-EIA	<a href="mailto:wadrion@nsf.gov">wadrion@nsf.gov</a>
	Michael Foster-EIA	<a href="mailto:mfoster@nsf.gov">mfoster@nsf.gov</a>
EHR:	P. Wyn Jennings-DGE (Co-Chair)	<a href="mailto:pjenning@nsf.gov">pjenning@nsf.gov</a>
	Roosevelt Y. Johnson-DUE	<a href="mailto:ryjohnso@nsf.gov">ryjohnso@nsf.gov</a>
	Nora Sabelli-REC	<a href="mailto:nsabelli@nsf.gov">nsabelli@nsf.gov</a>
ENG:	Lawrence S. Goldberg-ECS (Chair)	<a href="mailto:lgoldber@nsf.gov">lgoldber@nsf.gov</a>
	Bruce K. Hamilton-DMII	<a href="mailto:bhamilto@nsf.gov">bhamilto@nsf.gov</a>
	Theresa A. Maldonado-EEC	<a href="mailto:tmaldona@nsf.gov">tmaldona@nsf.gov</a>
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	Roddy R. Rogers-ATM	<a href="mailto:rrogers@nsf.gov">rrogers@nsf.gov</a>
MPS:	Joseph Brennan-DMS	<a href="mailto:jbrennan@nsf.gov">jbrennan@nsf.gov</a>
	H. Hollis Wickman-DMR	<a href="mailto:hwickman@nsf.gov">hwickman@nsf.gov</a>
SBE:	Paul G. Chapin-BCS	<a href="mailto:pchapin@nsf.gov">pchapin@nsf.gov</a>
	Marjorie A. Lueck-INT	<a href="mailto:mlueck@nsf.gov">mlueck@nsf.gov</a>
	Frank P. Scioli Jr.-SES	<a href="mailto:fscioli@nsf.gov">fscioli@nsf.gov</a>
OPP:	Jane V. Dionne	<a href="mailto:jdionne@nsf.gov">jdionne@nsf.gov</a>



Questions related to the use of FastLane should be directed to FastLane User Support, at 703-306-1142, or [fastlane@nsf.gov](mailto:fastlane@nsf.gov).

## **IX. OTHER PROGRAMS OF INTEREST**

The NSF *Guide to Programs* (NSF 99-04) is a compilation of funding for research and education in science, mathematics, and engineering. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter. Many NSF programs offer announcements concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices listed in Appendix A of the GPG. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF Bulletin, available monthly (except July and August), and in individual program announcements. The Bulletin is available electronically via the NSF Web Site at <http://www.nsf.gov/home/ebulletin>. Subscribers can also sign up for NSF's Custom News Service at <http://www.nsf.gov/home/cns/start.htm> to find out what funding opportunities are available.

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at (703) 306-1636.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Relay Service (FRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 306-0090, FRS at 1-800-877-8339.

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### PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Pursuant to 5 CFR 1320.5(b), an agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Information Dissemination Branch, Division of Administrative Services, National Science Foundation, Arlington, VA 22230, or to Office of Information and Regulatory Affairs of OMB, Attention: Desk Officer for National Science Foundation (3145-0058), 725 - 17th Street, N.W. Room 10235, Washington, D.C. 20503.

Catalogue of Federal Domestic Assistance (CFDA) No.: 47.074 (BIO); 47.070 (CISE); 47.076 (EHR); 47.041 (ENG); 47.050 (GEO); 47.049 (MPS); 47.075 (SBE); 47.078 (OPP)

OMB No.: 3145-0058

NSF 00-78 (Replaces NSF 98-96) *Electronic Dissemination Only*